

Appl. No. 09/837,004
Amdt. Dated July 29, 2005
Reply to Office Action of June 3, 2005

Attorney Docket No. 81846.0026
Customer No.: 26021

REMARKS

This application has been carefully reviewed in light of the Office Action dated June 3, 2005. Claims 8-9 and 11-15 remain in this application. Claim 8 is the independent Claims. New Claim 16 has been added. It is believed that no new matter is involved in the new claim or arguments presented herein. Reconsideration and entrance of the new claim in the application are respectfully requested.

Art-Based Rejections

Claims 8, 9, and 11 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 4,370,356 (Bok) in view of U.S. Patent No. 5,762,749 (Suzuki). Claim 12 was rejected under § 103(a) over Bok in view of Suzuki, and further in view of U.S. Patent No. 6,406,541 (Cairncross). Claim 13 was rejected under § 103(a) over Bok in view of Suzuki, and further in view of U.S. Patent No. 4,017,982 (Gofferdo). Claim 14 was rejected under § 103(a) over Bok in view of Suzuki, and further in view of U.S. Patent No. 5,769,952 (Komino). Claim 15 was rejected under §103(a) over Bok in view of Suzuki and in further view of JPN 02-019470 A (Fujioka). Applicant respectfully traverses these rejections and submits that the claims herein are patentable in light of the clarifying arguments below.

The Bok Reference

Bok is directed to the meniscus coating of a substrate by flowing a coating material through a permeable and sloping surface so as to develop a downward laminar flow of coating material on the outside of the sloping surface. The substrate surface is advanced tangentially to the downward laminar flow of coating material such that the surface to be coated intersects the laminar flow of coating material at the apex of the sloping, permeable surface. Menisci of flowing coating

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material are supported both at the leading edge and the trailing edge of coating material in contact with the surface to be coated. The uniform disengagement and drainage of deposited excess coating material from the coated surface are ensured by uniform menisci and the constant downward laminar flow of coating material on the outside of the sloping surface. (*See, Bok, Col. 1, lines 40-57*).

The Suzuki Reference

Suzuki is directed to an apparatus for removing liquid from a substrate. According to Suzuki, a gas jetting device for jetting gas to a surface of a substrate is provided. (*See, Suzuki; Col. 2, lines 17-24, lines 34-36*).

The Cairncross Reference

Cairncross is directed to an improved method of mounting particles on a surface having an array of tacky and non-tacky areas thereon. The method includes obtaining surfaces having an array of tacky and non-tacky areas thereon. Flowing particles across the surface to allow particles to contact the tacky areas and adhere thereto. Heating to a temperature of at least 30° C. Removing the excess particles not adhered to the tacky areas. (*See, Cairncross, Col. 1, lines 38-50*).

The Goffredo Reference

Goffredo is directed to a drying apparatus that provides a cool air screen for impelling liquid from articles being dried. The drying apparatus also employs heated air directed at the articles after they pass the cooler air knives. Air is delivered to the duct by a blower and diverted by means of an adjustable deflection plate into one of two channels. One channel directs air to the cooler air knives that effect a blowing-off of liquid from the articles, and the other channel directs air

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across the heated air knives so as to provide warmer drying. (*See, Goffredo, Col. 1, line 50 to Col. 2, line 4*).

The Komino Reference

Komino is directed to a reduced and normal pressure treatment apparatus that enables improved treatment quality and throughput when performing normal pressure treatment. By shortening the time interval between the reduced and normal pressure processes, a normal pressure treatment is performed immediately before or after reduced pressure processing. (*See, Komino, Col. 3, lines 13-21*).

The Fujioka Reference

Fujioka is directed to enabling the formation of deposit film by activating raw material gas containing H with plasma of inert gas in the method for introducing precursor to be film making material and activated seed interacting with the above in film making space. (*See, Fujioka, Page 1, paragraph 1*).

The Claims are Patentable Over the Cited References

The present application is generally directed to a method and apparatus for manufacturing a semiconductor device made by forming a thin film on a substrate, such as a thin-film photovoltaic module.

As defined by independent Claim 8, an apparatus for manufacturing a semiconductor device having a thin film on a substrate includes a washing section for washing the substrate with a washing liquid. A liquid-removing section is included for removing the washing liquid from the substrate by blowing pre-heated compressed air to the substrate washed. A film-forming section is included for forming a thin film on the substrate from which the washing liquid has been

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removed. The liquid-removing section has an air knife which is inclined in a first direction that is horizontally perpendicular to a transfer direction of the substrate and inclined in a second direction that is vertically perpendicular to the transfer direction of the substrate so as to blow compressed air towards a rear edge of the substrate.

The applied references are not seen to disclose or suggest the above features of the present invention as defined by independent Claim 8. In particular, Bok does not disclose or suggest, "the liquid-removing section has an air knife which is inclined in a first direction that is horizontally perpendicular to a transfer direction of the substrate and inclined in a second direction that is vertically perpendicular to the transfer direction of the substrate so as to blow compressed air towards a rear edge of the substrate," as required by independent Claim 8.

The deficiency of Bok was recognized in the Office Action. Accordingly, ancillary Suzuki reference was applied to remedy the above. Applicant respectfully traverses the applied references.

According to the Office Action, Bok disclose a liquid removing section for removing the washing liquid from the substrate by blowing compressed air to the substrate washed. (*See, Office Action; Page 2, Para. 4, lines 3-4*). According to the Office Action, Suzuki also discloses a liquid removing section blowing compressed air to the substrate washed. In addition, Suzuki discloses the liquid removing section, for blowing compressed air, has an air knife which is inclined in a first direction that is horizontally perpendicular to a transfer direction of the substrate and inclined in a second direction that is vertically perpendicular to the transfer direction of the substrate so as to blow compressed air towards a rear edge of the substrate. (*See, Office Action; Page 3, Para. 6*). Moreover, the Office Action asserts

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obviousness providing the air knife of Suzuki to Bok in order to blow compressed air towards toward a rear edge of the substrate in Bok. (*See, Office Action; Page 3; Para. 7*).

Applicant respectfully submits Bok does not teach or suggest a liquid removing section for removing the washing liquid from the substrate by blowing compressed air to the substrate as asserted in the Office Action. Applicant notes Bok teaches a liquid removing method of solvent evaporative technique such as a controlled gaseous flow process. (*See, Bok; Fig. 4; Col. 3; lines 59-63; Col. 6; lines 44-46*). It is well known in the art that evaporation requires a liquid changing into gas. However, solvent evaporation cannot be said to be equivalent or analogous to using a compressed air to blow the liquid off a rear edge of the substrate.

Applicant respectfully submits Bok and Suzuki cannot be properly combined to remedy the deficiency of Bok because such combination changes the principle of operation of Bok's teaching.

Since the cited reference fails to disclose, teach or suggest the above features recited in independent Claims 8, these references cannot be said to anticipate nor render obvious the invention which is the subject matter of the claim.

Accordingly, independent Claim 8 is believed to be in condition for allowance and such allowance is respectfully requested.

Ancillary references Cairncross, Gofferdo, Komino, and Fujioka are not seen to remedy the above deficiency of Bok. The remaining claims depend either directly or indirectly from independent Claim 8 and recite additional features of the invention which are neither disclosed nor fairly suggested by the applied references and are therefore also believed to be in condition for allowance. New Claim 16 recites "the liquid-removing section has at least two air knives disposed on the same

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side of the substrate wherein each of the air knives covers a portion of the substrate", which is not disclosed or suggested by the applied references.

Conclusion

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6809 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,
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